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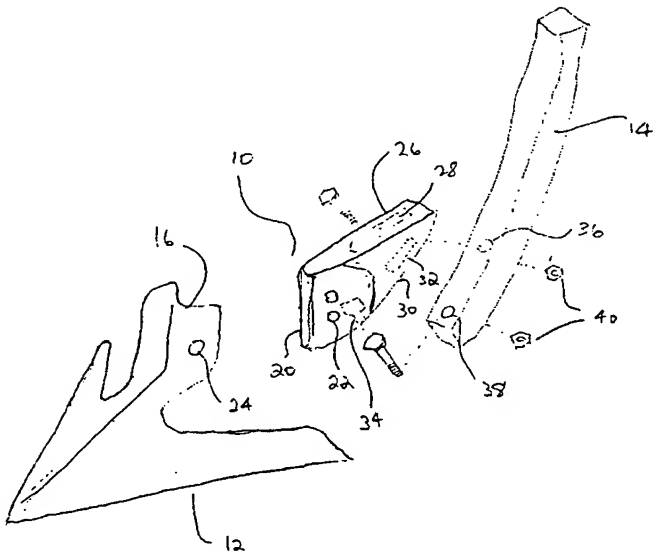
(54) ADAPTATEUR DE MONTAGE DE BRAS DE CULTIVATEUR POUR OUTILS AGRAIRES

(54) SHANK MOUNTING ADAPTER FOR GROUND-OPENING TOOLS



(57) An adapter for mounting a sweep to a cultivator shank includes a forward facing prow section, a trailing section and a mounting face which mates with the cultivator shank. The prow section defines a sweep mounting bolt hole and a bolt receiving recess which is open through the mounting face and to one side of the adapter. The trailing section defines an elongated slot which is open through the adapter and the mounting face. The adapter mounts to the cultivator shank by means of a bolt which is received in the recess and another bolt which passes through the slot. The sweep mounts to the adapter by means of a bolt received in the sweep mounting bolt hole.

ABSTRACT OF THE DISCLOSURE

An adapter for mounting a sweep to a cultivator shank includes a forward facing prow section, a trailing section and a mounting face which mates with the cultivator shank. The prow section defines a sweep mounting bolt hole and a bolt receiving recess which is open through the mounting face and to one side of the adapter. The trailing section defines an elongated slot which is open through the adapter and the mounting face. The adapter mounts to the cultivator shank by means of a bolt which is received in the recess and another bolt which passes through the slot. The sweep mounts to the adapter by means of a bolt received in the sweep mounting bolt hole.

CA PATENT
FILE NO. 45113-04

SHANK MOUNTING ADAPTER FOR GROUND-OPENING TOOLS

Field of the Invention

The present invention relates to agricultural implements, and relates in particular to an adapter for mounting ground-opening tools on cultivator shanks.

Background of the Invention

Crop farming requires the soil to be opened by plowing in order that seeds may be planted at a desired depth below the soil surface. This plowing operation is commonly carried out using a cultivator, which is an implement having a number of downward-oriented shanks to which ground-opening tools may be mounted. Ground-opening tools, commonly referred to as "sweeps", are typically vee-shaped or wedge-shaped, and have an upstanding stem for mounting to the shanks of the cultivator. As the cultivator is drawn forward, such as by a tractor, the shanks may be lowered so that the sweeps penetrate the soil to a desired depth, forming a furrow in which seeds may be deposited. Typically, the seeds are deposited through seed boots mounted to the cultivator shanks immediately behind the sweeps.

Despite being made of metal, sweeps become abraded and worn as they are pulled through the soil, and they may also become damaged by objects in the soil such as rocks. For such reasons, sweeps need to be replaced regularly. However, removal and replacement of sweeps is often a difficult and time-consuming operation. Shanks are typically made from square or rectangular bar stock, with a pair of holes passing from front to back through the shanks near their lower ends. Sweeps are commonly mounted to such shanks with bolts running through the holes in the stem of

the sweep and the shanks, with one end of each bolt exposed in front of the stem and the other end exposed on the back face of the shank. The bolts are thus exposed to abrasive action and moisture in the soil. The abrasive action of the soil as the shank is drawn forward may lead to premature wear. As a consequence of exposure to moisture, the bolts often rust such that the threads of the bolts become "frozen", making it virtually impossible to remove the bolts in the usual fashion. In such cases the only alternative may be to cut the bolts off with a hacksaw or even an acetylene torch. This is very inconvenient because it will often be desired to replace one or more sweeps while the cultivator is operating out in the field, perhaps miles from a convenient workshop, perhaps in inclement weather conditions, and perhaps late in the day when lighting conditions are poor.

The prior art discloses numerous attempts to address some of these problems. The apparatus described in U.S. Patent No. 4,195,697, issued to Griffin on April 1, 1980 (corresponding to Canadian Patent No. 1,093,889 issued to Griffin on January 20, 1981), features a two-piece bracket which bolts onto a typical shank using the standard holes in the shank, with the shank being sandwiched between the two pieces of the bracket. The portion of the bracket mounted on the rear face of the shank has one or more transverse holes for fastening a sweep with one or more bolts. The Griffin apparatus uses a sweep having a stem with flanges that extend rearward of the shank and which have holes corresponding to the transverse holes in the rear component of the bracket. The sweep covers up the heads of the bolts that attach the two-piece bracket to the shank. No means for adapting the two piece bracket to shanks with different hole spacing is disclosed.

In US Patent No. 4,867,248, issued to Robertson et al. on September 19, 1989 a shank mounting assembly for a soil opening point also provided an adapter between the point and the shank. In this case, the elongated adapter comprises an upper shank mounting portion and a lower point-mounting portion. The lower portion included a forwardly extending tongue that is received by a rearwardly open socket of the point. A transversely extending pin then secures the tongue and point. The upper portion of the adapter is provided with a hidden bolt-retaining cavity at the backside for mounting on the shank. Thus, no boltholes are presented on the front face of the

assembly by which soil can gain access to bolt heads. To provide for a slight variation in the angle of attack of the point, a shim may be located between the upper portion of the adapter and the shank.

While the above-mentioned patents represent improvements in the art of bolt-mounted cultivator sweep constructions, a disadvantage is that they require the manufacture and assembly of multiple parts. In addition, they do not provide for height adjustments of the sweeps that would allow for greater control of tillage conditions. There is a need in the art, therefore, for a simply constructed, easily releasable bolt-mounted cultivator sweep assembly wherein the height and the angle of attack of the sweep may be independently adjusted.

Summary of the Invention.

The invention provides an agricultural cultivator apparatus wherein a ground-opening tool may be removably mounted onto a standard tool supporting shank by means of an adapter. In one embodiment, the adapter is of unitary construction and generally comprises a mounting face, configured to mate with the front surface of the tool holding portion of a shank, a bullnosed prow section and a trailing section. The tool is secured onto the prow section by means of a bolt that projects transversely through the prow and the tool. The adapter is so designed as to receive two longitudinally spaced-apart shank bolts that project from front to back through the lower tool-holding portion of the shank for securing the adapter on the shank. In the adapter, a recess open to one side of the prow section fits the lower shank bolt and a slot in the trailing section extending from the top through the bottom of the adapter fits the upper shank bolt.

In one embodiment, the prow section may also provide at least two vertically spaced apart transverse holes such that the ground-opening tool may be bolted onto the adapter using any one hole. In this manner, the height of the tool may be adjusted relative to a fixed mounting location of the adapter on the shank. The lower shank bolt receiving recess and the upper shank bolt receiving

slot of the adapter may be elongated along the length of the adapter. In this manner, the mounting location of the adapter on the shank may be adjusted upwards or downwards, within the limits of the recess and slot. When mounted on a shank having a vertical curvilinear configuration, this may also provide for adjustment of the angle of attack of the ground-opening tool.

Therefore, in one embodiment , the invention comprises an adapter for releasably mounting a ground opening tool to a cultivator shank having a tool holding portion defining an upper and a lower bolt hole, said adapter comprising:

(a) a mounting face, generally configured to mate with the tool-holding portion of the shank;

(b) a prow section configured to mate with a mounting stem channel of a ground opening tool and defining at least one hole through which a mounting stem bolt may be secured, the prow section also having a recess for receiving a lower shank bolt, the recess being open to one side of the prow section as well as through the mounting face and configured to receive the bolt with the head of the bolt retained within the recess and with the shaft of the bolt projecting through the mounting face; and

(c) a trailing section defining an opening for receiving an upper shank bolt which passes through the mounting face with the shaft of the bolt projecting through the opening.

In one embodiment, the mounting stem and the leading edge of the prow section are substantially vertical when mounted to the shank. The prow section may comprise a plurality of spaced apart holes that provide alternative locations for retaining the mounting stem bolt. The upper shank bolt receiving slot may be elongated. Alternatively, both the recess and the upper shank bolt-receiving slot may be elongated along the length of the adapter, thereby providing for a range of

mounting locations of the adapter on the shank, within the limits of the recess and the slot.

Brief Description of the Drawings

Embodiments of the invention will now be described with reference to the accompanying drawings, in which numerical references denote like parts, and in which:

FIGURE 1 is a perspective view of embodiment of an adapter of the present invention in relation to a sweep and a shank.

FIGURE 2 is a front view of the adapter shown in Figure 1.

FIGURE 3 is a side view of the adapter shown in Figures 1 and 2.

Detailed Description of an Embodiment

Referring to the Figures, an embodiment of the present invention comprises an adapter (**10**) of unitary construction for mounting a ground opening tool (12) such as a sweep to a cultivator shank (14).

As shown in Figure 1, the adapter (10) comprises a forward prow section (20) which mates with a mounting stem (16) of the sweep (12). The mounting stem (16) is U-shaped in cross-section so as to mate with the prow section (20). Mounting holes (22) in the prow section (20) allow the sweep (12) to be bolted to the adapter through a sweep bolt hole (24). In one embodiment, at least two mounting holes (22) which are vertically spaced apart are provided thereby allowing a user to adjust the vertical position of the sweep (12).

The adapter (10) further comprises a trailing section (26) which defines an opening which is

used to bolt the trailing section (26) to a shank. In one embodiment, the opening is a groove (28) and slot (28) which pass clear through the trailing section (26) and a mounting face (30). The mounting face (30) mates with the cultivator shank (14) and the groove (28) extends into a slot (32) which opens through the mounting face (30). Preferably, the groove is sized such that when a mounting bolt is placed in the groove (28) and passes through the slot (32), the head of the bolt engages the groove (28) such that it cannot rotate. As a result, a nut (40) may be tightened or loosened without the need to grasp the head of the bolt with a wrench or the like. The head of the bolt will bear on a shoulder (31) so as to secure the adapter to the shank.

The prow section (20) may also define an opening which is used to bolt the prow section to the shank. In one embodiment, this opening is a recess (34) which may receive a mounting bolt. The recess (34) is open to one side of the prow section (20) and through the mounting face (30) as is shown in Figure 3. The recess (34) defines a shoulder (35) which the head of the mounting bolt will bear upon when tightened. Preferably, the recess is shaped to closely receive the mounting bolt head such that the bolt cannot rotate when the bolt is placed in the recess (34).

The adapter (10) may be mounted to the cultivator shank by aligning the slot (32) with an upper bolt hole (36) in the shank and the recess (34) with a lower bolt hole (38) in the shank. In one embodiment, the slot (32) is elongated, thereby allowing the adapter (10) to be mounted to a wide variety of shanks with different bolt hole spacings.

In one embodiment, both the slot (32) and the recess (34) are elongated thereby allowing for some adjustability of the position of the adapter (10) on the shank. As a result, sweep height and angle of attack may be adjustable. For example, if the adapter is mounted lower on the shank, the tip of the sweep may be adjusted upward slightly. If the adapter is mounted slightly higher on the shank, the tip of the sweep may be adjusted slightly downward.

In the embodiment illustrated, the recess (34) and the lower sweep mounting hole (22) are shown to overlap. However, it is not intended that the position of the sweep mounting holes (22)

relative to the recess (34) be limiting of the claimed invention.

Preferably but not essentially, the adapter (10) is of unitary construction and may conveniently be cast with a suitable metal.

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It will be readily seen by those skilled in the art that various modifications of the present invention may be devised without departing from the essential concept of the invention, and all such modifications and adaptations are expressly intended to be included in the scope of the claims appended hereto.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An adapter for releasably mounting a ground opening tool to a cultivator shank having a tool holding portion defining an upper and a lower bolt hole, said adapter comprising:

(d) a mounting face, generally configured to mate with the tool-holding portion of the shank;

(e) a prow section configured to mate with a mounting stem channel of a ground opening tool and defining at least one hole through which a mounting stem bolt may be secured, the prow section also having a recess for receiving a lower shank bolt, the recess being open to one side of the prow section as well as through the mounting face and configured to receive the bolt with the head of the bolt retained within the recess and with the shaft of the bolt projecting through the mounting face; and

(f) a trailing section defining an opening for receiving an upper shank bolt which passes through the mounting face with the shaft of the bolt projecting through the opening.

2. The adapter of claim 2 wherein the mounting stem and the leading edge of the prow section are substantially vertical when mounted to the shank.

3. The adapter of claim 2 wherein the prow section comprises a plurality of spaced apart holes that provide alternative locations for retaining the mounting stem bolt.

4. The adapter of claim 2 wherein the upper shank bolt receiving slot is elongated.

5. The adapter of claim 4 wherein the recess and the upper shank bolt-receiving slot are elongated along the length of the adapter, thereby providing for a range of mounting locations of the adapter on the shank, within the limits of the recess and the slot.

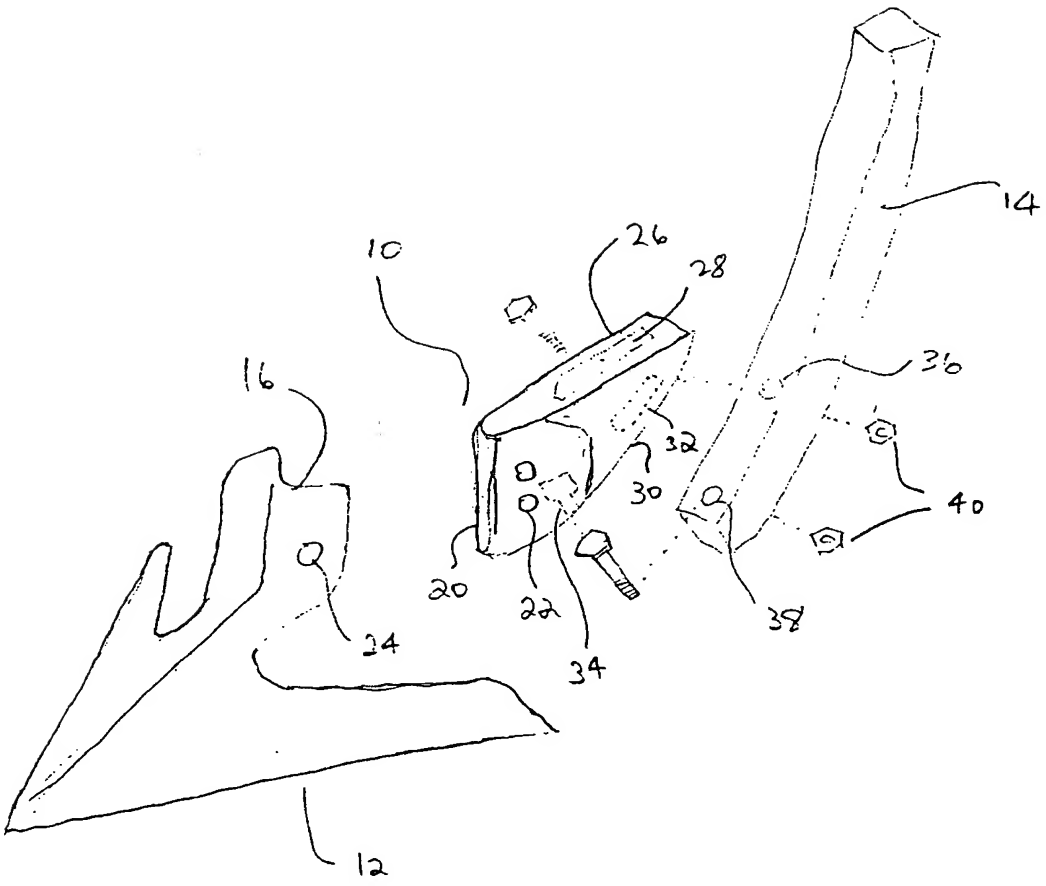
6. The adapter of claim 1 wherein the trailing section opening passes through the adapter and the mounting face and defines a shoulder which a bolt head may bear upon.

7. The adapter of claim 6 wherein the opening is sized such that a bolt head fits closely within the opening such that it cannot rotate within the opening.

8. The adapter of claim 1 wherein the prow section recess is sized such that a bolt head fits closely within the opening such that it cannot rotate within the recess.

9. The adapter of claim' wherein the adapter is of unitary construction.

FIG. 1



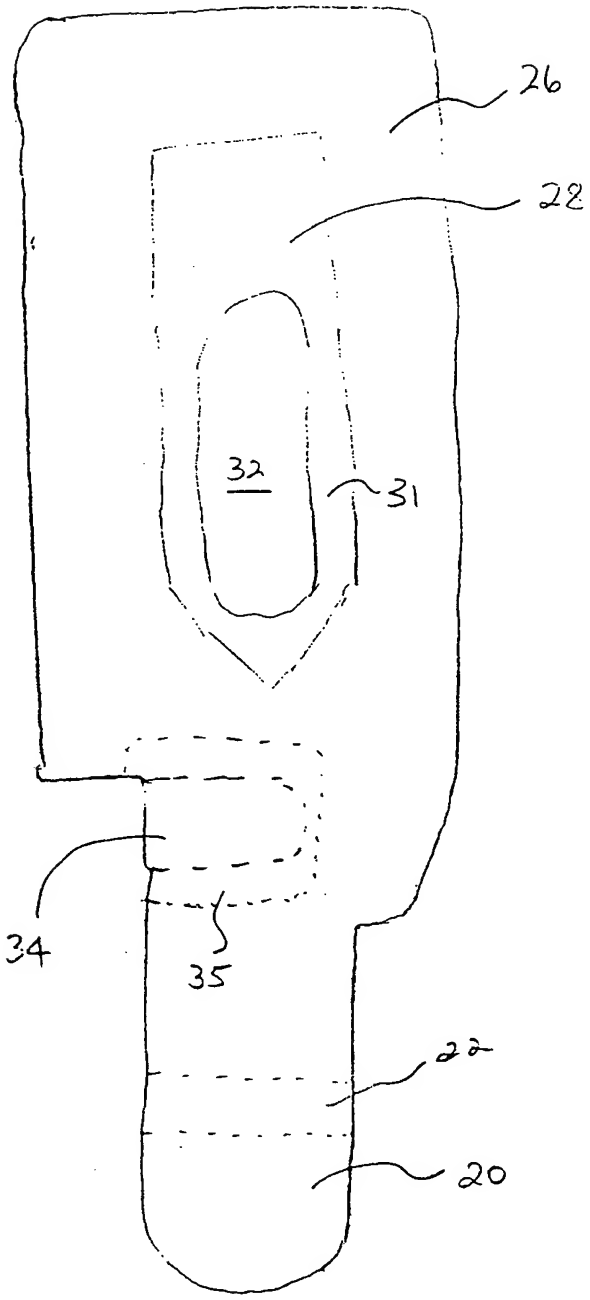


FIG. 2

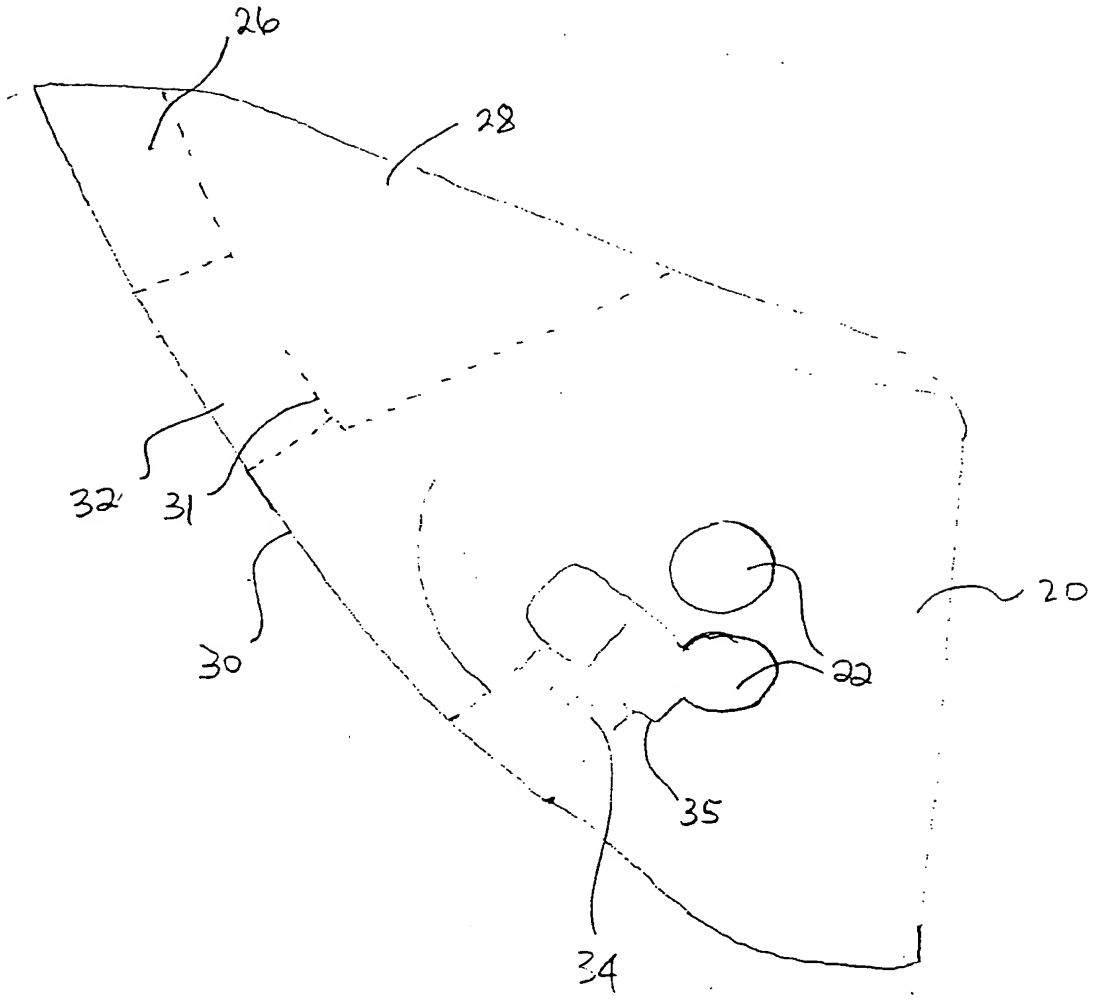


FIG. 3